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Developing android application-based interactive learning media with offline mode on excretion system materials at the hati kudus yesus catholic junior high school kroit

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Abstract
Based on the results of observations at the Hati Kudus Yesus Catholic Junior High School Keroit, learning problems experienced at school include the science learning process still tends to use online learning media by utilizing via whats app group, class or school, Learning using via whats app is sometimes not interesting, only showing only visuals or document contents (text books), There are no interesting variations in presenting data, Internet or network disturbances often occur in the learning process, Smartphones are often used as a medium for playing online games instead of being used as learning media, lack of understanding of students in the excretory system material due to learning by using via whats app group only displays text so that students do not understand the material in depth. Android application-based learning media has never been applied in learning.
This research aims to: 1) To develop learning media based on android applications; 2) To find out student responses to android applications on excretory system material.
The results of this study indicate that: 1) analysis, media that are suitable to be developed as learning media on Android-based science materials. 2) Design, in this step the researcher makes a media design (storyboard). 3) Development, at this stage the media is made, validation is done by media and material experts and science teachers. 4) Implementation, at this stage the implementation is carried out in class VIII of Hati Kudus Yesus Catholic Junior High School Keroit. The feasibility level of Android-based interactive learning media based on the assessment: (1) material expert validation obtained an average of 4.36 including the Very Eligible category (2) media expert validation for the first indicator obtained an average of 4.66 including the category Very Eligible, while the second indicator obtained an average of 4.55 including the Very Eligible category (3) validation for science learning practitioners obtained an average of 4.00 including the "Fair" category. This interactive learning media received a positive response from students with the acquisition of the percentage on all indicators reaching 100%. With the assumption that the media created is very helpful in learning.

Keywords: learning media, excretory system material, android, ADDIE

Introduction

Learning by using information and communication technology in student learning environments based on multimedia applications, and mobile learning with some assistance using displays in the form of audio, video, visual, or combining some of these features or components can provide a better and more interesting visual appearance in learning. So that it can explore the enthusiasm and motivation of students to learn, the application of media-based learning can also help teachers to make it easier to convey subject matter in the classroom and outside the classroom.

The development of education is very rapid, affecting the development of learning psychology and the existing education system. This situation encourages and results in the advancement of learning technology and new additions to learning media. Along with technological advances, the development of learning media is so fast, where each existing media has its own characteristics and abilities. From this, then arise structuring efforts, namely grouping or classification according to the similarity of characteristics or characteristics. The general characteristics of learning media according to Oemar Hamalik in (Talizoro, 2018: 5) are: First, learning media is identical with the notion of demonstration which comes from the word "body", meaning an object that can be touched, seen and heard and that can be observed. Through the senses. Second, the main emphasis lies on objects or things that can be seen and heard. Third, learning media is used in the context of the relationship (communication) in teaching between teachers and students. Fourth, learning media is a kind of teaching and learning aid, both inside and outside the classroom. Fifth, learning media is an "intermediary" (medium, media) and is used in the context of learning. Sixth, learning media contains aspects, as a tool and as a technique that is closely related to learning methods. Seventh, therefore, as an operational measure, this book uses the notion of "learning media". In addition to the characteristics above, then what is included in the learning Media. According to Arif Sadiman, as quoted by (Talizoro, 2018: 6) which divides into 8 classifications of media, namely: (1). Motion audio-visual media. (2). Audio visual media is silent. (3). Semi-motion audio media. (4). Motion visual media. (5). Visual media is silent. (6). Semi-motion visual media. (7). Audio media. (8). Print media.

One of the uses of learning media that is currently widely used by teachers and students in the learning environment is an Android-based learning application. The android application is a smartphone application whose part of the system comes from the Linux operating system (Nasrudin, 2011). This application is an

application that is very easy to access and use by students at the elementary, junior high, and high school levels. The presence of android-based learning applications in the school environment can be accessed by users (students and teachers) in various modes or ways, namely online mode or offline mode, which is why the use of android learning media in the school environment is very easy to implement.

In the Sacred Heart of Jesus Keroit Catholic Middle School, during the current covid 19 pandemic, the science learning process still tends to use online learning media by utilizing whatsapp-groups, and many students say learning by using whats app is sometimes not interesting only. display only visuals or only document contents (text books), there are no interesting variations in presenting data, and learning to use via whats app group must be in online mode so that learning feels unsatisfactory because you have to use paid tools or it can be said with quotas so that you can participate in learning, many students say that sometimes learning can be delayed or there are some students who do not participate in learning due to obstacles such as: internet network disturbances, media tools in the form of cellphones, in additions that many smartphones that are held by students today are not used as a learning medium instead of being used as a medium for playing online games, the lack of understanding of students on the excretory system material is due to learning using via whatsapp group only displays text so that students do not understand the material in depth, and also android application-based learning media has never been applied in learning.

Android is one of the operating systems on mobile devices. In the development of android applications using the Java platform as the programming language. Purwantoro, Rahmawati and Tharmizi (2013: 177) said "Android is a software (software) used on mobile devices (running devices) which includes an operating system, middleware and core applications. Google collaborates with more than 47 other companies that are members of the OHA (Open Handset Alliance) to create standards for mobile devices. (Angger Dimas, *et al*, 2017:4) [3].

Materials and methods

The research applied is a research and development (R&D) type. This method aims to produce a product and test the feasibility of the product. The product developed is an android application-based learning media with offline mode in science subjects, especially the excretory system material in class VIII. The R & D development model in the form of the final result of this learning media uses ADDIE (Analysis, Design, Development and Implementation, Evaluation).

In this research and development can be classified into two data, First, qualitative data in the form of criticism and suggestions from experts, teachers and students. Second, quantitative data through the analysis of various experts.

The procedure for developing learning media based on android applications. Which is used in developing this is adopted from Instructional Media Design, namely the ADDIE model. More details for the product development procedure in this study can be seen from the following figure:

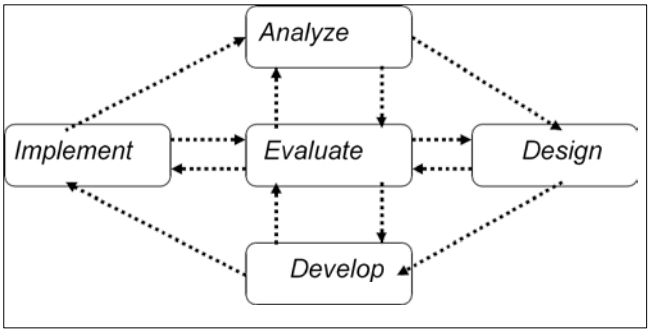

Fig 1: Stages of the ADDIE Model (Anglada, 2020)

Analysis

The analysis in question is conducting a needs assessment (needs analysis), identifying problems (needs), and conducting task analysis (task analysis). The analysis stage is a process of defining what students will learn in the learning environment, and conducting a needs assessment or (needs analysis), and then analyzing the needs of students in learning. This section of the analysis phase aims to see and analyze the needs and problems as well as the characteristics of students to produce products in the form of hardware and software

Design

Based on the previous data, the next step is to design or create a mobile learning design based on an android application. In this design stage, the first thing to do is to prepare tools in the form of hardware and software that will be used, then create a (storyboard). Storyboard is a design or overall media design and is a guide in making media. After that, compose the text of learning material from Ms. Word, then at the next stage is to make a list or grid of media assessments from both media test experts, material test experts, teachers and students.

Development

Development is realizing the pattern or design into a reality. That is, if the design requires a software in the form of a learning android application, then the android application must be developed. At this stage, the Android learning media will be made using additional software software. Furthermore, it will be validated by material expert lecturers, and media experts. After being validated by lecturers or examiners whose results are in the form of suggestions, comments, and input, the next step is to make revisions to develop products for the better based on suggestions given by media and material expert lecturers.

Implementation

Implementation is a real step to implement the android application media that we have made in learning. That is, at this stage everything that has been developed is modified, installed or arranged in such a way according to its role or function so that it can be implemented. At the implementation stage, it will be carried out in 1 stage, namely the small-scale trial stage. In the small-scale trial stage, it was carried out in class VIII of SMP with a number of students consisting of 8 students and was given a questionnaire to find out how good or bad the student's opinion was.

Evaluation

Evaluation is the final process of this development model. Evaluation is a process to see whether the learning application system in the form of an android application that is being built is successful, in accordance with the expected goals. This last evaluation is a process carried out to provide value to the learning application program. After the android application has been developed, the next step is to carry out validation activities for the resulting product. The following describes the results of product development trials ranging from small group tests, media expert tests, learning material expert tests, subject teacher tests, to student trials.

The data analysis technique used in this research is descriptive statistics. Descriptive statistics are used to analyze data by describing or explaining and describing in general and or generalizations (Sugiyono, 2013:208) [12]. Assessment data of material experts, media, Science subject teachers, and class VIII junior high school students.

Results and Discussion

The results of this study are interactive learning media based on android applications with offline mode on excretory system material. The following figure are some display results from android-based learning media

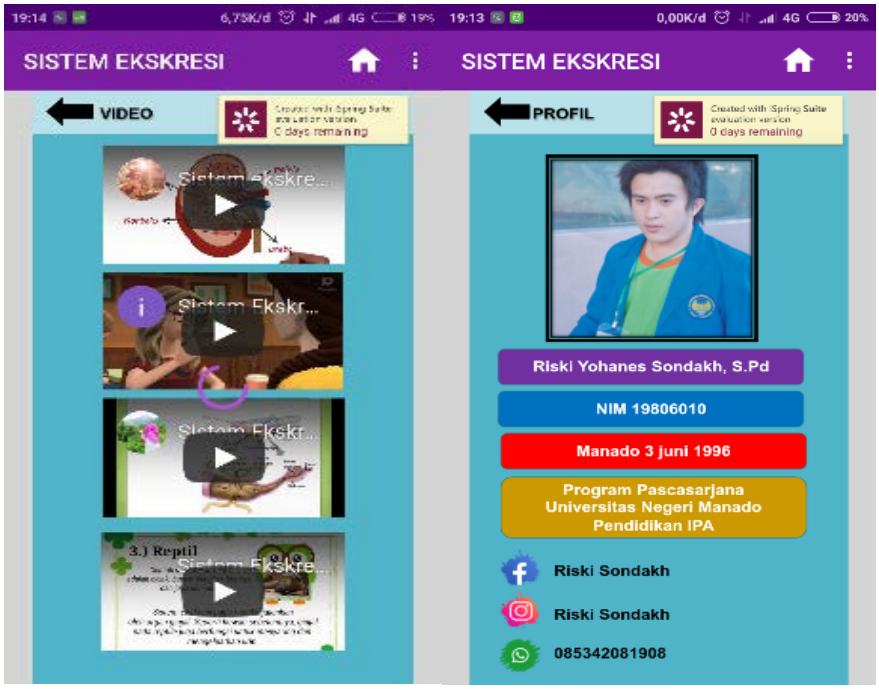

Fig 2: The display of interactive learning media based on android applications with offline mode on excretory system material after the media is revised, the media is validated by material experts by filling in the boxes provided in the questionnaire. The validation questionnaire used is a Likert scale questionnaire with 5 answer criteria, namely: strongly agree (SS), Agree (S), Disagree (KS), Disagree (TS), and Strongly Disagree (STS). The validation questionnaire for material experts/experts consists of 11 indicators. The validation results can be seen in the table below.

Table 1: Validation results from Material Expert

No	Indicator	Score
	The Aspects of Learning Design	
1	Conformity of learning objectives with KI and KD	5
2	2 Completeness of materials and comprehensive	4
3	3 The suitability of the material with the learning objectives	4
4	4 Clarity and systematic delivery of material	5
5	5 Ease of understanding the material	4
6	6 Clarity of sample questions	4
7	7 The accuracy of the answer key	5
8	8 Completeness of questions	4
9	9 Suitability of evaluation with learning objectives	4
10	10 The suitability of the evaluation with the material	4
11	11 Providing feedback on the evaluation.	5
Total		48
Average		4,36
Criteria		A/ Sangat Layak

From these data it can be concluded that the results of the assessment of the expert or material expert obtained an average of 4.36 where these results indicate that the material contained in this media is very feasible to be used or applied in learning media.

This is in line with the reference data in the Sukarjo conversion table where the value lies on a scale of 4.21- 5.00. After being revised, the media is validated by media experts. The validation results can be seen in the table below

Table 2: The result of the media expert validation

No	Indikator	Skor
Device Engineering Aspect		
1	Effective and efficient in development	5
2	Effective and efficient in use	5
3	Can be managed/maintained easily	5
4	Ease of media operation	5
5	Clear instructions for use	4
6	App selection accuracy	4
Total Score		28
Average		4,66
Criteria		A / Very Good
Visual Display Aspect		
7	Compatibility of color selection	4
8	Letter selection compatibility	4
9	Button design compatibility	5
10	Suitability of design pattern layout pola	5
11	The suitability of the image display with the material	5
12	Image proportion balance	4
13	Sound effect selection compatibility	4
14	Design neatness	5
15	Attractive design	5
Total Score		41
Average		4,55
Criteria		A / Very Good

From the data above, it can be concluded that the assessment results from experts or media experts obtained an average of 4.55 where these results indicate that this android-based mobile learning is very feasible to use or apply in learning. This is in line with the reference data in the Sukarjo conversion table where the value lies on a scale of 4.21-5.00.

Science learning practitioners / teacher who validate digital learning media using Android-based smartphones on excretory system materials.

The validation questionnaire for science learning practitioners consists of 18 indicators. The validation results can be seen in the following table.

Table 3: The Validation results from Science Learning Practitioners

No	Indicator	Score
The Aspects of Learning Design		
1	Conformity of learning objectives with KI and KD	4
2	Material equipment	4
3	The suitability of the material with the learning objectives	4
4	Clarity of material delivery	4
5	Ease of understanding the material	4
6	Explanation of sample questions	4
7	Answer key accuracy	4
8	Completeness of questions	4
9	The suitability of the evaluation with the learning objectives	4
10	The suitability of the evaluation with the material	4
11	Providing feedback on evaluation.	4
Total Score		44
Average		4
Criteria		B/ Good
The Device Engineering Aspect		
12	Effective and efficient in use	4
13	Can be managed/maintained easily	4
14	Ease of media operation	4
15	Clear instructions for use	4
Total Score		16
Average		4
Criteria		B/ Good
The Visual Display Aspect		

16	Communicative	4
17	Design neatness	4
18	Attractive design	4
Total Score		12
Average		4
Criteria		B/ Good

From the data above, it can be concluded that the results of the assessment of Science Learning Practitioners obtained an average of 4 where these results indicate that this android-based mobile learning is feasible to be used or applied in learning. This is in line with the reference data in the Sukarjo conversion table where the value lies on a scale of 3.40 4.21.

The implementation stage is carried out after the development stage and after being revised by several experts. This implementation stage only consists of one stage, namely by testing in small groups. In the small group trial phase, 8 students of class VIII Junior High School were conducted. Before carrying out a small-scale trial, students first install the apk on the android smartphone. And the test results can be seen in the table below.

Table 4: Student Questionnaire Results

No	Indicator	Answer		Total	Percentage of Yes Answers
		Yes	No		
1	Clarity of material delivery	8		8	100%
2	Explanation of the examples provided	8		8	100%
3	Clarity of question formulation	8		8	100%
4	Clarity of discussion	8		8	100%
5	Clarity of language use	8		8	100%
6	Attractive media design	8		8	100%
7	The ability of media in improving students' understanding	8		8	100%
8	The use of media in learning activities	8		8	100%

Based on the data above, it can be seen that the responses of all students to the media that have been made generally have a very decent value with a percentage reaching 100% for each item provided. This is in line with what was said in Sunoto (2007:38) that student responses are considered positive if the average percentage opinion is above 65%. With the feasibility of each indicator reaching 100%. Based on the data above, it can be concluded that the student's response to the Excretory System Science learning media in the form of an Android-based Mobile Application is positive with the percentage reaching 100%.

This development research is very relevant to research conducted by previous researchers including:

Dewi Agushinta, Agung Satria (2018) [5]. "Virtual reality and Android based human excretory system 3D learning". The results showed that the overall scale reached 3,585 where the eligibility criteria was B or feasible.

Almira Eka Damayanti, *et al* (2018) [1]. "The Feasibility of Physics Learning Media in the Form of an Android-Based Pocket Book on Static Fluids". The results of the research on material experts showed an average of 79.85% in the appropriate category, while the assessment from media experts showed an average of 887.96% in the very feasible category, for teachers it reached an average of 87.77% in the very feasible category, and for student respondents it reached an average of 83.92% with a very decent category.

Surya Amami Pramuditya, Muchammad Subali Noto, and Henri Purwono (2018) [13]. "Design of Android-Based Educational Games on Mathematical Logic Materials". The results showed that the average for all validators reached 93.76% with a very decent category.

Putriaji Hendikawati, Muhammad Zuhair Zahid, Riza Arifudin (2019) [10]. Android-Based Computer Assisted Instruction Development as a Learning Resource for Supporting Self-Regulated Learning". The results showed that most of the students (76%) stated that the CAI media had reached the "good" predicate, or in the proper category, while 12% of them considered the media to have reached the "very decent" criteria.

Fitra Suci Arista, Heru Kuswanto (2018). "Virtual Physics Laboratory Application Based on the Android Smartphone to Improve Learning Independence and Conceptual Understanding". The results of the research from material experts showed an average of 87% with a very decent category, while from media experts showed an average of 92% with a very decent category.

From the data above, the learning media on the Android-based excretory system material is suitable for use in learning both inside and outside the school environment.

Conclusion

1. The development stage of learning media on android-based excretory system material using the ADDIE development model which consists of several stages, namely:

a. Analysis stage: includes analysis of student needs and character as well as analysis of media used in the learning process,

b. Design stage: includes making designs on learning media such as story boards compiling materials, questions, and other menu placements,

c. Development stage: includes media creation, validation from material experts, validation from media experts, and validation from science learning practitioner teachers

d. Implementation: at this stage the implementation is only carried out on a small scale with 8 students in grade 8 of the Sacred Heart of Jesus Catholic Middle School Keroit

2. Implementation of android-based excretory system learning media with offline mode on a small scale consisting of 8 respondents the results show above 65% with a very suitable category for use in learning media.

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